

CHILDREN'S PANEL AND CONNECTOR BUILDING SET

5 This application claims the benefit of U.S. Provisional Patent Application No. 60/453,252
filed on March 7, 2003, and U.S. Provisional Patent Application No. 60/442,610 filed on January
24, 2003.

FIELD OF THE INVENTION

 This invention relates to children's building kits, and more specifically to a panel and
10 connector set for children to temporarily construct structures.

BACKGROUND OF THE INVENTION

 The present invention provides a construction set for children. Many children use
construction sets to create temporary structures. Such kits are helpful to challenge a child's
imagination, and additionally assist children in learning spatial, physical and interactional
15 relationships.

 One style of prior construction kit, such as Legos® kits or blocks, uses hand or smaller
sized pieces. These pieces can be used to create miniaturized assemblies which children can
easily view and carry; however, such kits do not provide a child a larger sized assembly to
manipulate, nor do they provide interactive play.

20 An alternate style of prior kits involves bulky or oversized pieces that are used to create
larger assemblies. Although larger structures can be created, in kits with larger pieces hard
and/or heavy materials with potentially sharp edges can be unsafe for falling on or otherwise
causing a danger to the child. Separately, manipulating larger heavy and/or awkward pieces can
sometimes be difficult for smaller children.

25 A different style of panel kits are not intended for assembly and dis-assembly by
children, but are used to create structures which are intended to be semi-permanent for storage or

space separation. Typically these kits require fasteners and tools for assembly, include larger and heavier components and may require instructions or training for assembly. These systems are not suitable for small children to play with.

There is a need for a safe yet flexible children's construction kit. The present invention
5 addresses this need.

SUMMARY OF THE INVENTION

According to a preferred embodiment of the present invention, a modular toy building kit is provided. The kit includes a plurality of building panels, each having a circumference with edges. A plurality of tabs are defined on each panel with one tab defined along each edge. The
5 kit further includes a plurality of connectors, each connector having a length and having slots defined along the length. Each slot is sized to slidably receive and temporarily retain a tab of a building panel.

Another embodiment of the present provides a self-contained toy panel and connector building set. The set includes a base having a rectangular support surface with four corners. The
10 set includes at least four connectors, each having a height and four longitudinal sides with a longitudinal slot in each longitudinal side. Each of the connectors is positionable adjacent one of the support surface corners. The set further includes at least four panels, each panel having tabs, wherein each tab is sized to be received and selectively retained in one of the connector slots. The panels are engagable with the connectors to form walls to a storage compartment mounted
15 on and enclosing the support surface on the base. The storage compartment is sized to store additional panels and connectors.

In a further embodiment, the present invention provides a connector and panel set with a plurality of panels, each panel having edges with lengths, and a plurality of connectors, each connector having sides forming a standard height. Each edge of each panel is engagable to a side
20 of any connector and the height of the connectors differs from the length and the width of each panel edge. Preferably, a stack of connectors forms a height with joints between the connectors and a stack of panels forms a height with joints between the panels, wherein the joints of the stack of connectors are not aligned with the joints of the stack of panels.

In a still further preferred embodiment, the present invention provides a toy set, having a panel and connector kit; and one or more activity boards. The activity board is selectively mountable and removable to the panel and connector kit. Preferably the activity board comprises a hanging member configured to selectively mount the activity board to a panel of the panel and connector kit. The activity board provides a mounting area for a range of games, learning materials, and /or writing or drawing.

It is an object of the invention to provide an improved panel and connector system for children.

It is a further object of certain preferred embodiments of the present invention to provide a toy panel and connector system which is easy and safe for small children to assemble and disassemble.

Further objects, features and advantages of the present invention shall become apparent from the detailed drawings and descriptions provided herein.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view of one embodiment of the present invention.

Fig. 2 is an alternate perspective view of the embodiment of Fig. 1 with one side panel and the lid removed.

5 Fig. 3A is a top view of pieces of one embodiment of the present invention.

Fig. 3B is a perspective view of pieces of one embodiment of the present invention.

Fig. 3C is one embodiment of the present invention in one configuration.

Fig. 3D is one embodiment of the present invention in an alternate configuration.

Fig. 4A is a perspective view of a panel used in one embodiment of the present invention.

10 Fig. 4B is a top view of the panel of Fig. 4A.

Fig. 4C is an end view of the panel of Fig. 4A.

Fig. 5A is a perspective view of a different panel used in one embodiment of the present invention.

Fig. 5B is a top view of the panel of Fig. 5A.

15 Fig. 5C is an end view of the panel of Fig. 5A.

Fig. 6A is a perspective view of a still further panel used in one embodiment of the present invention.

Fig. 6B is a top view of the panel of Fig. 6A.

Fig. 6C is an end view of the panel of Fig. 6A.

20 Fig. 7A is a perspective view of a connector used in one embodiment of the present invention.

Fig. 7B is a side view of the connector of Fig. 7A.

Fig. 7C is an end view of the connector of Fig. 7A.

Fig. 8A is a top view of an activity board used in one embodiment of the present invention.

Fig. 8B is a side view of the activity board of Fig. 8A.

5 Fig. 9A is a perspective view of a panel with an activity board used in one embodiment of the present invention.

Fig. 9B is a top view of the panel and activity board of Fig. 9A.

Fig. 9C is a cut-away side view of the panel and activity board of Fig. 9A.

Fig. 9D is a partial, cut-away side view of the panel and activity board of Fig. 9C.

Fig. 10A is a perspective view of a base used in one embodiment of the present invention.

10 Fig. 10B is a top view of the base of Fig. 10A.

Fig. 10C is a side view of the base of Fig. 10A.

Fig. 10D is a perspective bottom view of a base used in one embodiment of the present invention.

Fig. 10E is a bottom view of the base of Fig. 10D.

15 Fig. 10F is a side view of the base of Fig. 10A.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

For the purposes of promoting an understanding of the principles of the invention, reference will now be made to the embodiments illustrated and specific language will be used to describe the same. It will nevertheless be understood that no limitation of the scope of the invention is thereby intended, such alterations, modifications, and further applications of the principles of the invention being contemplated as would normally occur to one skilled in the art to which the invention relates.

According to some preferred embodiments, the present invention provides an activity set for children, for example small children such as three year olds. In certain embodiments, the activity set is a kit that includes panels and connectors plus additional pieces. Children may assemble the panels and connectors in various configurations without tools, fasteners or training to create temporary structures designed by their imagination. In preferred embodiments the elements of the kit are lightweight and sized to be easily manipulated by children yet sturdy for long-term play. Preferably the kit is made from materials suitable for indoor and outdoor use. The kit elements are preferably modular to be substantially interchangeable and are designed to facilitate ease of assembly and dis-assembly.

Illustrated in Figs. 1 and 2 is one preferred embodiment of the present invention included system or kit 10. Kit 10 generally includes long panels 30, short panels 40 and connectors 50. As a preferred feature, kit 10 can be configured to form a self-containing storage compartment. In the embodiment illustrated, four connectors 50 form corners 26 arranged on a generally rectangular base 14. Two panels 30 form the sides 22 and two panels 40 form the ends 24 and interconnect with corners 26 to form an interior storage compartment. A lid 20, similar to base

14, may be placed across the top of the storage compartment. Wheels 16 are optionally mounted to base 14 to facilitate the ability to move kit 10.

The interior of the storage compartment is arranged to receive the pieces of kit 10. For example, Fig. 2 illustrates horizontal stacking of long panels 30, short panels 40 and connectors 50 on base 14 within the sides 22, ends 24 and corners 26. Alternately, the panels may be arranged in a vertical stack.

The elements of kit 10 are preferably interchangeable and connectable to form various configurations, such as walls, doors and/or windows. Non-limiting examples of arrangements are illustrated in Figs. 3A-D. Preferably the edge portions of the long panels 30, short panels 40, triangular panels 70, base 14 and lid 20 are removably and slidably interlockable with connectors 50 to form structures. The panels and connectors can be arranged vertically, horizontally and/or stacked as desired. Non-limiting examples of potential configurations include a maze, a playhouse, a cave, a climbing structure, a loft, an airplane, a train, a chair and a table.

Views of a preferred embodiment of a long panel 30 are illustrated in Figs. 4A-C. Panel 30 is preferably formed in a generally rectangular shape forming a length (ℓ) and a width (w) with curved corners, although other geometric shapes with generally straight edges can be used, examples include triangles, trapezoids, pentagons, hexagons, and octagons. As illustrated, panel 30 includes four edges 32. Extending from each edge is a web or thinner portion 34. At the outer portion of each web 34 is a connector or tab, such as a T-shaped tab 36. Each web and tab extends generally along the length of an edge, terminating adjacent the beginning of the arcuate corner curve. As a preferred feature, each tab 36 includes a changed cross-section which is a beveled or tapered portion 37 in both width and thickness adjacent one or preferably both ends. As a separate preferred feature, panel 30 defines mounting openings 39. As an optional feature,

panels may have circular openings or handles 38 assisting for grasping the panels, or portions formed or removed to form windows. Such windows will typically be open, with a frame formed by the surrounding panel.

Views of a preferred embodiment of a short panel 40 are illustrated in Figs. 5A-C. Panel 40 is preferably formed in the rectangular shape of a square forming a length (ℓ) and a width (w), although other geometric shapes can be used. Panel 40 includes four edges 42. Extending from each edge is a web or thinner portion 44. At the outer portion of each web 44 is a connector or tab, such as a T-shaped tab 46. As a preferred feature, each tab 46 includes a changed cross-section which is a beveled or tapered portion 47 adjacent one or both ends. As a separate preferred feature, panel 40 defines mounting openings 49.

Views of a preferred embodiment of a triangular panel 70 are illustrated in Figs. 6A-C. Panel 70 includes three edges 72, two of which form a base and height of equal length (w). Extending from each edge is a web or thinner portion 74. At the outer portion of each web 74 is a connector or tab, such as a T-shaped tab 76. As a preferred feature, each tab 76 includes a changed cross-section which is a beveled or tapered portion 77 adjacent one or both ends. As a separate preferred feature, panel 70 defines mounting openings or handles 79.

Views of a preferred embodiment of a connector 50 are illustrated in Figs. 7A-C. Connector 50 has two ends and four longitudinal sides defining a height (h). Each longitudinal side defines a longitudinal slot or groove 56 between corner edges 52. Preferably slot 56 is configured to slidably receive a tab 36, 46 or 76 of any kit panel 30, 40 or 70. In a preferred feature, corner edges 52 include slight bevels or tapers 57 at one or both ends to facilitate the introduction of tabs into slots 56. In a further preferred feature, the corner edges 52 include feet

53 defined at each end of connector 50. Feet 53 assist in stabilizing and stacking each connector 50.

Illustrated in Figs. 8A & B is one preferred embodiment of an activity board 60 usable in certain embodiments of kit 10. Activity board 60 is selectively mountable to panels of kit 10.

5 As illustrated, board 60 is formed in a generally rectangular shape sized to fit approximately within the edges 32 of a long panel 30. This is for illustration only and alternate sizes and geometric shapes can be used as desired. Various children's activities such as posters, chalkboards, marker boards, and/or educational activities or games can be mounted on activity board 60. Preferably extending from activity board 60 is an offset member or hanger 62.

10 Hanger 62 is configured to selectively mount activity board 60 to a chosen panel.

In a preferred embodiment, hanger 62 includes a handle portion 64. Handle portion 64 is illustrated as a spherical portion or ball, but alternate shapes such as hooks, cross-members, springs or clamps can be used. In one embodiment, hanger 62 is a short-cylindrical member connected at a proximal end to board 60 and connected at a distal end to handle portion 64.

15 Handle portion 64 can be connected to hanger 62 by a screw-on connection, welding, rivets, integrally molded or similar well-known connection methods. Preferably, hanger 62, including handle portion 64, is sized to fit through openings in panels 30, 40 or 70. In a preferred embodiment, activity board 60 includes two hangers 62 with handle portions spaced at a sufficient distance to engage two opening in the same or separate panels.

20 Illustrated in Figs. 9A-D are views of an activity board 60 mounted to a panel, for example panel 30. When placing board 60 in position, hanger 62 with handle 64 is guided through an opening 39 in a selected panel 30. Board 60 is then released slightly downward to rest hanger 62 on the lower portion (as oriented) of opening 39 to prevent downward movement

of board 60 relative to panel 30 (Fig. 9D). Further, preferably a portion of handle 64 extends slightly beyond the inner edge of opening 39 when hanger 62 is resting on the lower portion of the opening. The portion of handle 64 which overlaps panel 30 prevents hanger 62 from unintentionally withdrawing from opening 39. Preferably with two such hanger and handle
5 connections to panel 30, activity board 60 is prevented from unintended separation.

As a preferred safety feature, jostling or accidental movement of activity board 60 relative to panel 30 typically moves hanger 62 around the periphery of the inner edge of opening 39. Such movement around the periphery maintains the overlap of a portion of handle 64 over the panel, minimizing the risk of accidental separation. Activity board 60 is removed by lifting
10 the board and guiding handles 64 through the center of openings 39. It will be understood that the hangers and activity board can be mounted in both horizontal and vertical orientations to long or short panels of kit 10 with appropriate sizing and arrangements.

Views of a preferred embodiment of base 14 are shown in Figs. 10A-F. In one embodiment, base 14 is slightly thicker than a standard panel, and the lower side (fig. 10D)
15 optionally includes recesses 17 for castors or wheels 16. During shipment or storage, wheels 16 can be stored in recesses 17 to conserve space, and are removed and mounted to base 14 when desired.

Base 14 is preferably slightly larger than a standard panel of kit 10 to provide a sturdy base when kit 10 is in a self-containing storage arrangement. Extending from the edges of base
20 14 around a support surface are side supports 18 and end supports 19. Side supports 18 and end supports 19 include tabs similar to the tabs on panels 30 or 40 which are slidably connectable to connectors 50. Side supports 18 and end supports 19 further include wider webs or support portions 34' and 44' extending between the edges of base 14 and the tabs. Preferably the wider

webs 34' and 44' are dimensioned so that the profile of tabs 34 or 44 on panels 30 or 40 is receivable between the base edges and the support tabs. When kit 10 is in a stored configuration, sides 22 and ends 24 rest upon side supports 18 and 19, preferably on webs 34' and 44', to enclose the support surface.

5 In one embodiment, a slight protrusion or lobe 21 extends from each corner of the base and supports at least one foot 53 of each corner connector 26 to prevent the corner connector from sliding below the level of the support surface. Preferably the storage compartment volume over the support surface is sized to contain and store panels and connectors. Lid 20 is preferably similar to base 14. In a preferred feature (not shown), base 14 and lid 20 include partial
10 impressions to provide a similar look to openings 38 in long panels 30.

 In preferred features, the components of kit 10 are lightweight materials without sharp edges or sharp corners. For example, the kit can be made with hollow, blow-molded, polyethylene panels and injection molded ABS connectors. Alternately, the panels can be made from a transparent material, such as polycarbonate, which may be clear or tinted.

15 In a preferred embodiment, the panels and connectors are based on the largest practical size which a small child, such as a three year old, can manipulate and assemble with two hands. As a non-limiting example, in one embodiment short panels 40 have a length and width of eighteen (18) inches, large panels have a length of thirty-six (36) inches and a width of eighteen (18) inches and connectors 50 have height of thirteen and a half ($13\frac{1}{2}$) inches, and triangular
20 panels 70 have a base and height of eighteen (18) inches. In this embodiment, the panels are approximately one and half ($1\frac{1}{2}$) inches thick. Base 14 has a length of forty-one (41) inches and a width of twenty-three (23) inches. Typically in this sizing, the child will only have a limited

vertical reach, limiting the overall height of the assembled structure. According to this example, the typical maximum assembly height by a three-year old would be fifty-four inches.

In one aspect of kit 10, preferably the connector height differs from the length and width measurements of the panels. This ensures that one connector will be shorter (or longer) than any
5 panel while a stack of connectors will span any joints between panel stacks within a typical child's reach without the connector joints and panel joints being aligned or having equal heights. For example, if the panel dimensions are in eighteen inch multiples and the connectors are thirteen and half inches in height, two short panels can be stacked, forming a height of thirty-six inches and a joint at eighteen inches. A stack of three connectors will have a height of forty and
10 a half inches with joints at thirteen and half inches and twenty-seven inches. A long panel would have the same geometry without one joint. Examples of this concept are illustrated in Figs. 3A-C.

The system of the present invention is usable by a small child without using tools or fasteners or the need for training. Typically for shipment or storage, kit 10 is placed in a self-
15 containing arrangement with or without the wheels attached. When used by a child, the child can choose components of the system to assemble a structure as desired. Access to components can be facilitated by removing one side (Fig. 2). When assembling components, the edge portions or tabs of a panel are slidably engaged with a slot on a connector (Figs. 3A-B). The beveled or tapered end portions on the panel tabs and the connector slot edges facilitate the introduction of
20 the tab into the slot and ease the sliding engagement. This creates a temporary interlocking engagement where the panel and connector cannot be disengaged except by sliding. Preferably the interlocking engagement includes sufficient "wiggle" room in the connection that the sliding

engagement and dis-engagement is easily done without binding and allows the angle of the panel to the connector to be slightly adjusted as desired.

For continued assembly, multiple connectors and combinations of short and long panels may be combined in vertical and horizontal arrangements to create temporary structures, examples are shown in Figs. 3C-D. When play activity with the kit is complete, the pieces can be efficiently dis-assembled and returned to a storage configuration.

While the invention has been illustrated and described in detail in the drawings and foregoing description, the same is to be considered as illustrative and not restrictive in character, it being understood that only the preferred embodiment has been shown and described and that all changes and modifications that come within the spirit of the invention are desired to be protected.